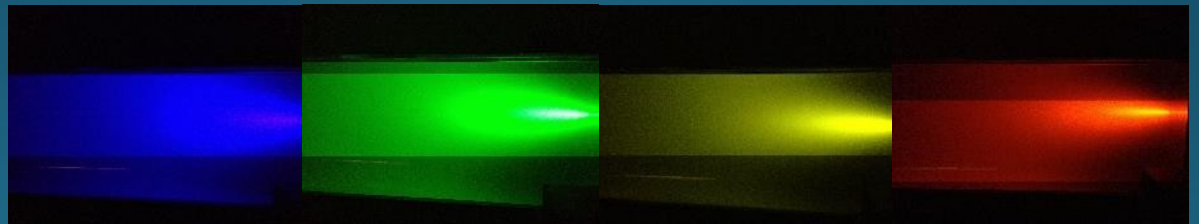


Optical Layers Deployment

March 16-27, 2016



Goals

Project

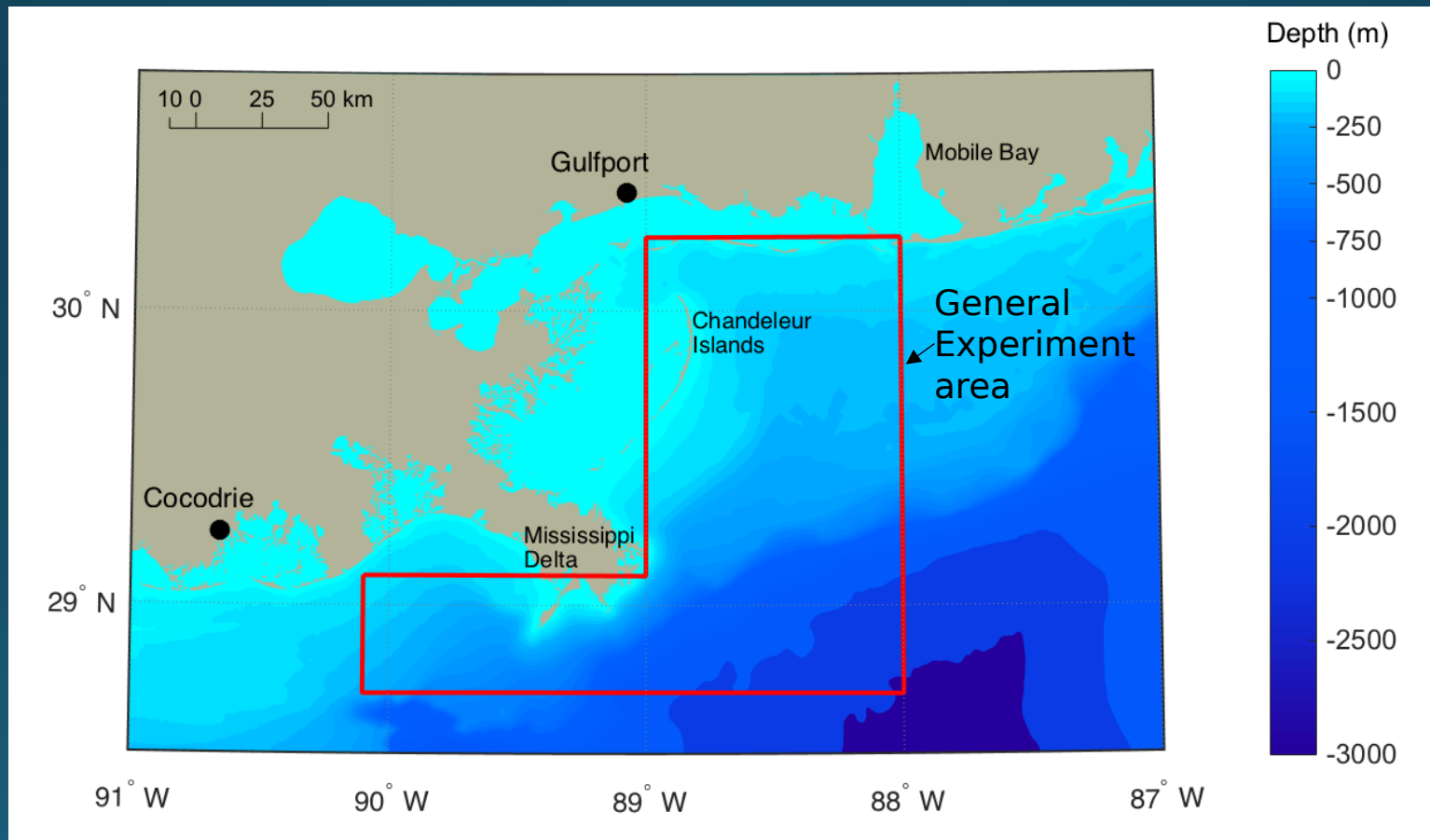
- Remotely detect and characterize particle layers in the ocean with combined active/passive sensors
- Assimilate layer information into 3-D models to better forecast the optical fields in the coastal ocean

Cruise

- Test newly developed techniques and methods with ship-borne polarimetric and multi-wavelength lidars
- Test ability of the Calipso spaceborne lidar to detect subsurface layers

Location

- Northern Central Gulf of Mexico
 - Mississippi River plume
 - East of Mississippi Delta
 - Near Barrier Islands of Alabama, Mississippi



Vessel – R/V Pelican

- Based in Cocodrie, LA
- 116' in length
- 18 days endurance
- 3500 mile range
- 8 kn cruising speed
- 12-14 science crew



Equipment\Data Collection

- Multi-wavelength lidar
- Polarimetric lidar
- Profiling lidar
- In-water optics
- In- and Above-water Radiometry
- Water Samples
- Towed, undulating Scanfish
- Bottom-mounted Profilers (BOPPERS)
- Wire Mooring

Equipment\Data Collection

- Multi-wavelength lidar (MuWLE)
 - Daytime wavelengths: 440, 488, 532, 580, 633, 676 nm
 - Nighttime wavelengths: 420, 440, 488, 500, 515, 532, 565, 580, 600, 633, 650, 676 nm
 - Fluorescence filters: 530, 595, 685 nm
- Polarimetric lidar (SLOP)
 - 532 nm, linear and circular co- and cross polarization channels, two fields of view (?)
- Profiling lidar
 - 532 nm, linear co- and cross-polarization channels, two fields of view
- In-water optics
 - Hyperspectral absorption, scattering, and attenuation coefficients, CDOM absorption, backscattering coefficients, volume scattering functions, particle size distributions
- In- and Above-water radiometry
 - Hyperpro – in-water hyperspectral downwelling irradiance, upwelling radiance
 - ASD – above-water remote sensing reflectance
- Water samples

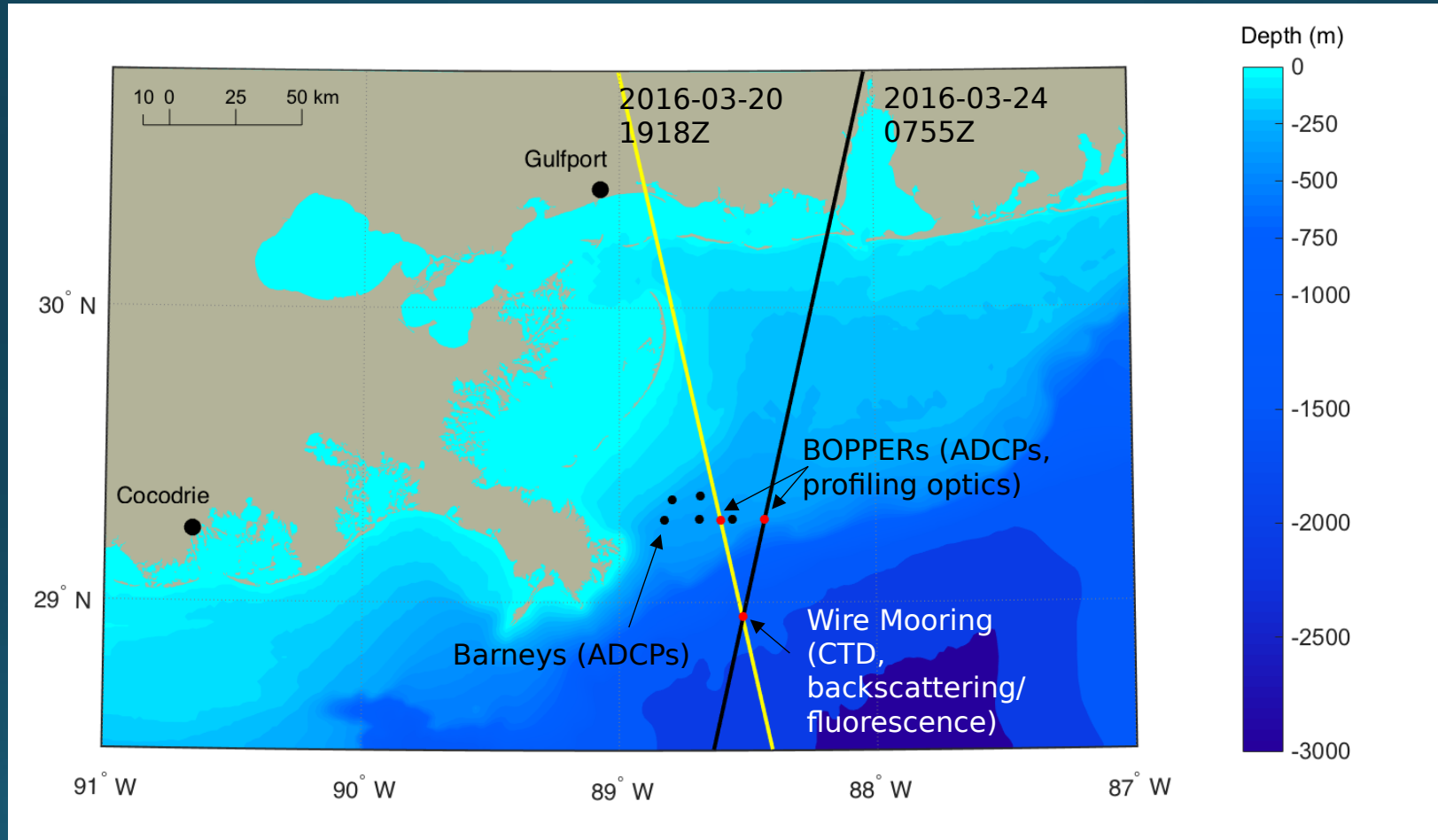
Equipment\Data Collection

- Towed undulating vehicle (Scanfish)
 - CTD, hyperspectral absorption, scattering, and attenuation coefficients, 3-channel backscattering (440, 532, 650 nm), fluorescence (CDOM, Chlorophyll, phycoerythrin), 7-channel downwelling irradiance (412, 443, 490, 532, 555, 670, PAR), oxygen
- Bottom mounted profilers (BOPPERS)
 - Current profilers (ADCPs), 7-channel downwelling irradiance (412, 443, 490, 532, 555, 670, PAR), 3-channel backscattering (443, 532, 650 nm), fluorescence (CDOM, Chlorophyll, phycoerythrin), attenuation (650 nm)
- Wire mooring
 - CTDs, backscattering/fluorescence (532, 650, Chlorophyll)

Science Crew

Personnel	Affiliation	Role
Deric Gray	NRL-DC	Lidar, IOPs, AOPs, dye, meddling
Glen Frick	NRL-DC	Lidar, dye
Derek Burrage	NRL-SSC	Scanfish, moorings
Joel Wesson	NRL-SSC	Lidar, scanfish
Wes Goode	NRL-SSC	IOPs, AOPs, lidar, scanfish, moorings
Andy Quaid	NRL-SSC	Scanfish, moorings
Ian Martens	NRL-SSC	Scanfish, moorings
Fraser Dalglish	HBOI	Profiling Lidar
Anni Dalglish	HBOI	Profiling Lidar
Nicole Stockley	HBOI	IOPs
Bob Stavn	UNCG	Water samples
Amy Gonsalves	UNCG	Water samples

Mooring Locations and Calipso Overpasses



Note: There is some uncertainty in Calipso tracks; will adjust mooring locations when we get better track predictions

Stations/Scanfish/Lidar

Stations will be categorized as long (LS) and short (SS), depending on data collected

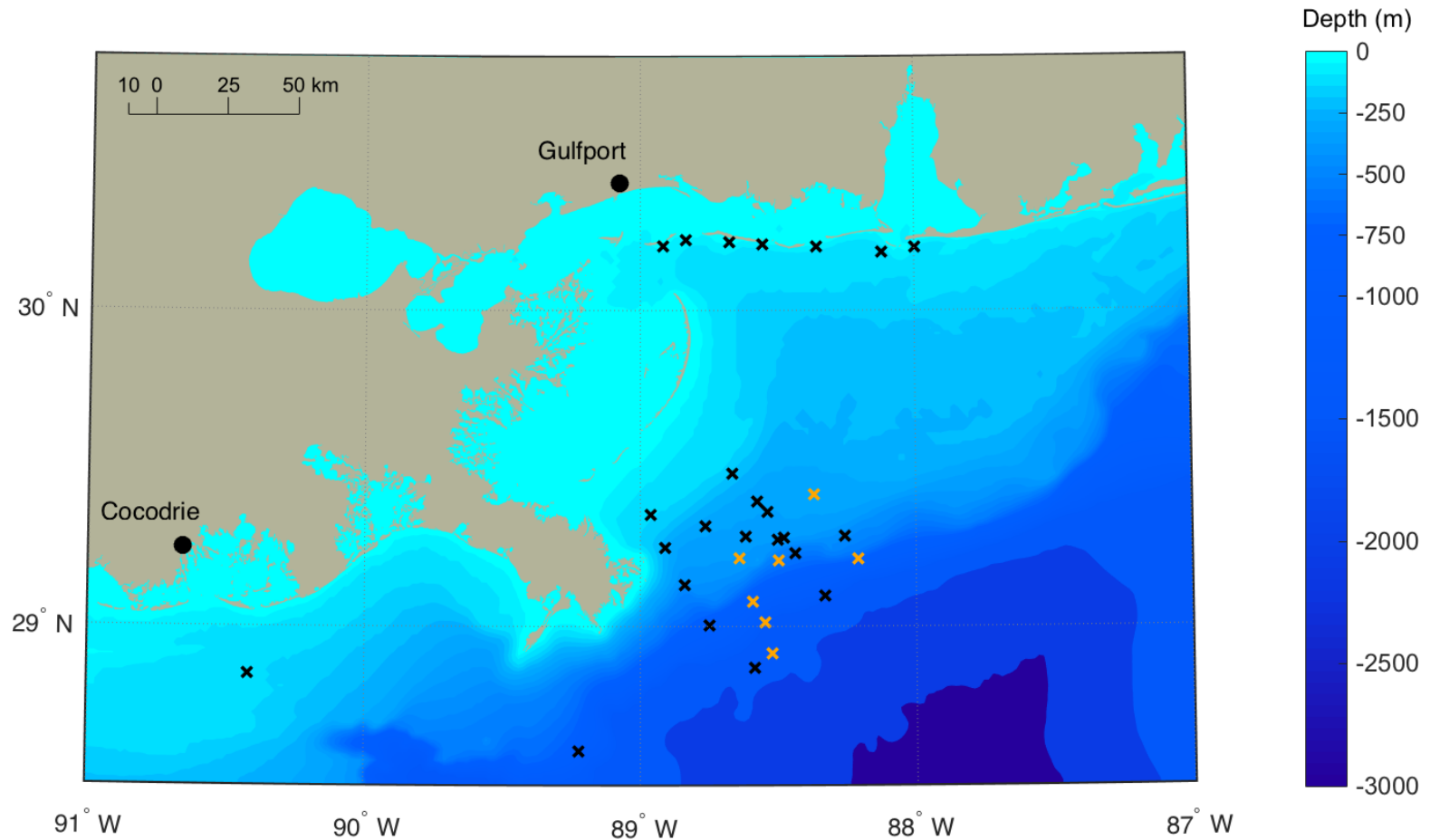
- Long Station
 - CTD/water samples
 - Optical profiler
 - MVSM/LISST
 - Profiling lidar
 - Hyperpro
 - ASD
- Short Station
 - CTD/water samples (possible)
 - Optical profiler
 - MVSM/LISST
 - ASD

Scanfish tows with coincident ship-based lidar will take place between stations.

We expect variations to scanfish tows and long and short stations throughout the cruise

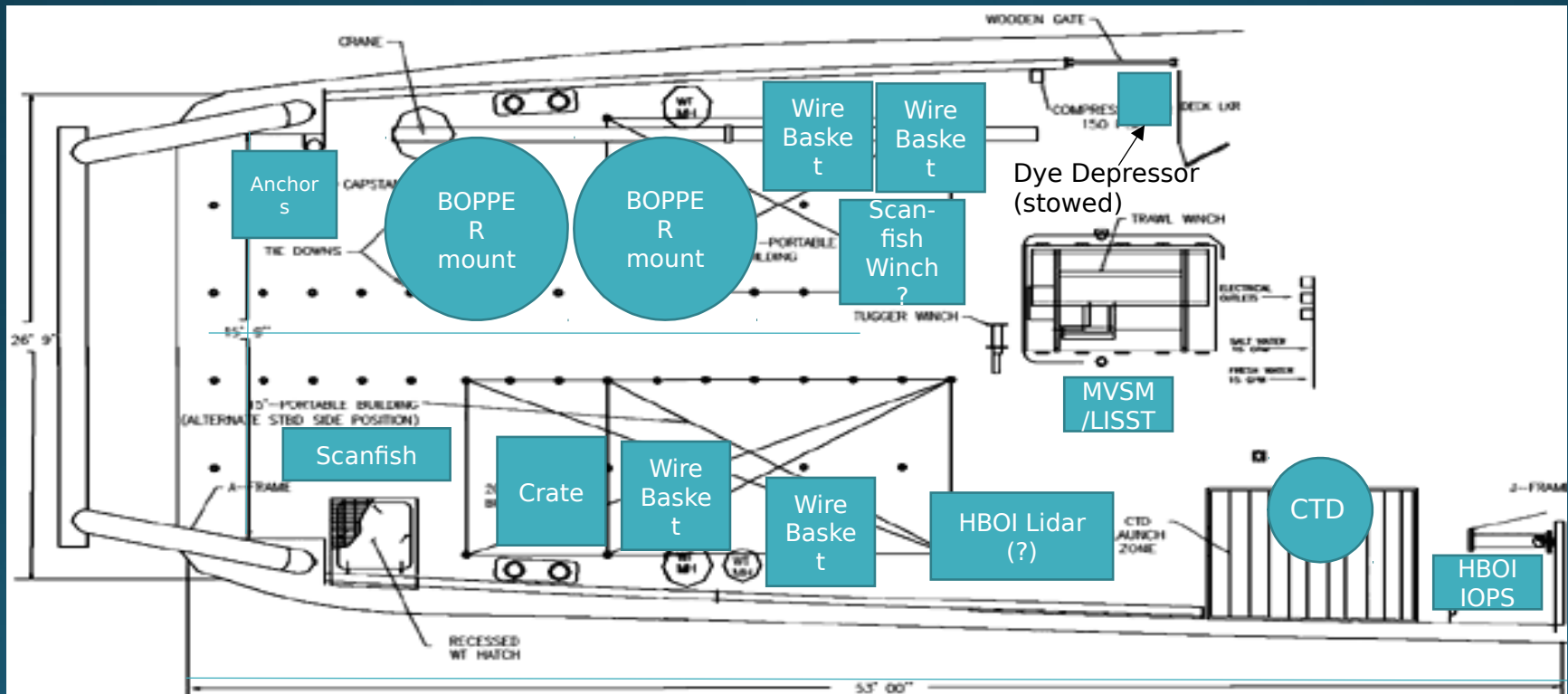
Station Locations

Orange indicates potential locations of dye releases
See kml file for long and short stations and scanfish tows



Deck Layout

- Possible deck layout
- Space will be tight



Dye Release

- Surface and subsurface releases
- Outrigger will be installed and deployed on port side
- Surface release from sprayer attached to outrigger
- Towed depressor from outrigger with dye diffusers at discrete depths



Dye Release

Sketch of subsurface dye release

